REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections and the comments relative thereto. Favorable reconsideration of the application is respectfully requested in light of the following detailed arguments.

After amendment, claims 17, 19-22 and 28-42 are pending in this application. In this response, claim 17 was amended to include the subject matter of previously pending claim 18 which was canceled. It is respectfully submitted that no new matter has been presented in these amendments. Applicants make this amendment without prejudice towards future pursuit of the subject matter of the previously pending claim 17 in a divisional application.

A request for a two month extension of time, with the appropriate fee, has been submitted herewith.

REJECTIONS UNDER 35 USC §102

Claims 17-22, 28-31 and 41-42 were rejected under 35 USC §102 as being anticipated by US 5,624,998 to Itoh et al. The Examiner states that Itoh discloses an aqueous gel interposed between two or more transparent plates which is made from sodium silicate and a hydrocarboxylic acid such as tartaric or lactic acid. It is noted that the Examiner rejects previously pending claim 18 under 35 USC §102 but makes no specific reference to this claim in the rejection under 35 USC §102, instead specifically referencing this claim in the rejection under 35 USC §103.

Before discussing the prior art, applicant would like to point out for the Examiner's convenience features of the present invention. The present invention, as defined in amended claim 17, relates to a clear intumescent interlayer produced by drying a clear stable aqueous solution comprising an alkali metal silicate waterglass, a water soluble aluminate and a hydroxy carboxylic acid according to under controlled conditions. The interlayer comprises from 10 to 35% by weight of water.

The amended claims are directed to clear intumescent interlayers which have a relatively low water content. It is agreed that silicate based interlayers of similar type are well known in the art as is recited in the second and third paragraphs of the

application. Examples of known silicate interlayers are sold by the assignee of the present invention under the Trade Marks PYROSTOP® and PYRODUR®. They are produced by pouring a solution upon the surface of a glass pane and drying that solution to form a clear interlayer. Interlayers having a low water content provide a higher degree of fire resistance than systems which contain high water contents. This fact is confirmed by reference to column 6 line 62 of the applied reference (Itoh).

It is significant that the interlayers must be optically clear and remain clear over a period of years of they are to be useful in a fire resistant glazing. This requirement is particularly challenging for interlayers having a relatively low water content, as in that case the solid ingredient is more likely to separate from the fluid medium and form an interlayer whose optical properties are not acceptable for use in a glazing.

It is respectfully submitted that Itoh does not disclose an interlayer having a water content of from 10 to 35% by weight. The reference discloses interlayers which preferably have a water content of about 60% by weight or less (column 6 line 65). However the skilled man would not understand this to embrace a water content of 35% by weight, especially in light of the preceding sentence which states thathigh water content makes fire resistance low. Itoh contemplates a water content of 60% or just a little lower as is confirmed by a review of Examples 1 to 5 where the minimum water content used is 52.7% in Example 1 (column 14 line 24). Itoh forms a fire resistant glazing by a cast in place process as disclosed in Example 11 (column 18 line 48) in which all the water in the solution is retained in the interlayer. One skilled in the art would recognize that this requires a high water content because the solution must be pourable and would not construe the general statement of Itoh of about 60% by weight or less as disclosing a water content of from 10 to 35% by weight.

Additionally, Itoh does not disclose an interlayer which is formed from a solution comprising an alkali metal silicate, a water soluble aluminate and a hydroxy carboxylic acid. Itoh clearly states that the interlayers of his invention may comprise a suspension of particulate metal oxide (column 2 line 46 and column 5 line 38). It is noted that the Examiner relies on column 5 line 58 of Itoh as disclosing a gel which is made from sodium silicate. It is respectfully submitted that this conclusion of the Examiner is not

justified by the disclosure. The passage relied upon comes from the paragraph stating at column 5 line 55 "In producing silicon dioxide..." This paragraph discloses routine methods of making particulate silica and is not relevant to the present invention. Itoh does not disclose an interlayer which is made from a silicate.

Similarly Itoh's reference to sodium aluminate at column 6 line 1 is to methods of producing a particulate aluminium oxide which can be usefully incorporated into his interlayers. Itoh does not disclose an interlayer formed from a water soluble aluminate.

Furthermore, Itoh fails to disclose a mixture of a silicate and an aluminate. Silicon dioxide and aluminium oxide are just two of the oxides disclosed as being useful at column 5 line 45 and are not taught as a mixture.

In view of the above, it is respectfully submitted that claim 17 (which now includes the subject matter of previously pending claim 18) is novel over the disclosure of Itoh. It is respectfully submitted that claim 17 should be allowable over the art of record.

REJECTIONS UNDER 35 USC §103

Claims 18 and 32-40 were rejected under 35 USC §103 as being unpatentable over US Patent 5,624,998 to Itoh, as discussed above. The Examiner no longer specifically references the website www.pqcorp.com in the rejection, but does refer to this website in the text of the rejections as disclosing state of the art.

The Examiner states that although Itoh does not explicitly disclose an example with a water content within the range 10 to 35% by weight it would have been obvious to have selected the overlapping porion of the range. Applicants submit that this rejection is not justified. As noted above Itoh does not disclose interlayers having any water content significantly below 60%, as is claimed herein, but rather those having a water content just below 60%. As noted above a water content of about 60% is clearly shown in the Examples of Itoh. Further, the statements of Itoh regarding the flame retardant properties of the higher water content interlayers also teach away from the claimed water content. Itoh clearly teaches that high water contents are desirable in order to improve the fire resistance of the interlayer. There is nothing in the Itoh

reference to teach or suggest water contents in the claimed range, and in fact, water contents in this range are effectively taught away from.

One skilled in the art would also recognize the differences between Itoh's interlayers which comprise a particulate metal oxide and those of the invention which comprise a water soluble silicate and aluminate. Itoh states at column 6 line 18 that the suspensions of particulate metal oxides are generally translucent white and that they become transparent when mixed with (meth)acrylamide derivatives. The interlayers of the present invention are derived from water soluble silicates. The present invention incorporates an aluminum compound into that interlayer without destabilizing it. This is accomplished by partially neutralizing an aluminate with a hydroxy carboxylic acid. There is nothing in Itoh which teaches or suggests this approach. Itoh's references to aluminium compounds are to particulate compounds. One skilled in the art would not regard Itoh as applicable to the present invention. As further evidence of that Applicants point to column 1 line 58 of Itoh. Itoh dismissed gels based on water soluble silicates as strongly alkaline and thereby dangerous. This directly teaches away from the teachings of the present invention. His solution is a system which uses particulate silica and is less alkaline. The price which he pays is a higher water content and a product having less fir resistance than the known silicate based systems.

It is respectfully submitted that interlayers produced from a solution comprising silicate and aluminate captures the arguments presented above and distinguishes the invention from the disclosure of Itoh which is confined to sytems comprising particulate oxides. Although silicate solutions are and were articles of commerce Itoh nowhere suggests that they are useful in his invention. The disclosure therein is limited to dispersions of metal oxides such as silica and is irrelevant to the present invention.

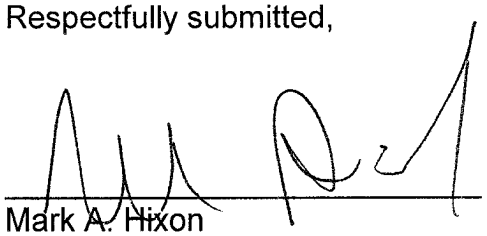
In view of the above it is respectfully submitted that the rejections of the claims under 35 USC §103 have been overcome.

SUMMARY

For the reasons above, it is submitted that independent claim 17 is allowable over the applied art of record. The remaining claims are believed to be allowable based, at least, upon their dependence from allowable base claims as shown above.

Should the Examiner wish to modify any of the language of the claims, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



Mark A. Hixon
Registration No. 44,766

ATTORNEYS
Marshall & Melhorn, LLC
Four SeaGate - 8th Floor
Toledo, Ohio 43604
(419) 249-7114
(419) 249-7151 Facsimile
Hixon@marshall-melhorn.com